

**Before the**  
**FEDERAL COMMUNICATIONS COMMISSION**  
**Washington, DC 20554**

**In the Matter of:**

A Petition for Rulemaking to Amend Part 97 of the  
Commission's Rules to Establish Technical Standards  
for Certain Amateur Radio Telephony Transmissions

RM-10740

**Comments of Philip E. Galasso, K2PG**

**1. Background and Introduction**

In the above Petition for Rulemaking, RM-10740, Michael D. Lonneke and Melvin J. Ladisky ("Petitioners") call for adding regulations to Part 97 of the Commission's Rules to severely limit the occupied bandwidth of Class A3E and J3E emissions on frequencies below 28.8 MHz that are allocated to the Amateur Radio Service.

I, Philip E. Galasso, have been an amateur radio operator since 1968, holding the Amateur Extra Class license with the callsign K2PG. I also hold a license in the Experimental Radio Service allowing operation in the LF spectrum under the callsign KA2XUK. I hold the General Radiotelephone Operator License with Ship Radar Endorsement, issued by the Commission in 1985 to supersede a First Class Radiotelephone Operator License with Ship Radar Endorsement that was issued to me in 1973, as well as the Broadcast Radio Engineer certification (CBRE), issued by the Society of Broadcast Engineers.

## **2. Legal Technicality**

In the heading of the above Petition for Rulemaking (“Petition”), the Petitioners refer to their document as being “In the Matter of Rulemaking under Part 97 of the Communications Act of 1934, as amended to Establish Technical Standards for Certain Amateur Radio Telephony Transmissions” (sic). Two technical defects exist in the very heading of this Petition for Rulemaking. First, Petitions for Rulemaking are governed by Section 1.401 of the Commission’s Rules, not by any section of Part 97, which governs the Amateur Radio Service.<sup>1</sup> Second, Part 97 is not part of the Communications Act of 1934, as amended, which authorized and created the Federal Communications Commission. The Communications Act of 1934 is divided into Titles and Sections, rather than parts. There is no “Section 97” in the Communications Act of 1934.<sup>2</sup> Part 97 of the Commission’s Rules is part of Title 47 of the United States Code, which is the Title encompassing telecommunications law in the United States. Therefore, the above Petition for Rulemaking is defective and should be denied on technical grounds. I will also discuss and refute various points made by the Petitioners in the above Petition for Rulemaking.

## **3. Discussion**

After World War II, amateur radio operators began experimenting with single sideband suppressed carrier emission, now designated as J3E emission and referred to as “SSB” emission by amateur radio operators. This type of emission eliminated the heterodynes that resulted when stations using conventional double sideband amplitude modulation (now designated as A3E emission) transmitted on adjacent frequencies. It also occupies half as much bandwidth (or less, depending upon the characteristics of the modulating audio and the filters in the transmitter) as a conventional A3E emission. J3E emission steadily increased in popularity throughout the 1960s and 1970s, becoming the predominant type of radiotelephone emission used on amateur frequencies below 29 MHz.

While J3E emission, or SSB, as it is colloquially known, is a very efficient means of communicating on congested HF bands, it often has an unnatural, “tinny” sound. This is caused by the characteristics of the microphones used with common, commercially available amateur transmitters and transceivers, the characteristics of the speech amplifier circuits in this radio equipment, and the RF/IF filters used in this equipment. This effect is particularly unpleasant on the female voice, which, when fed into the balanced modulator of the transmitter or transceiver, produces products that fall outside the passband of the filters.

In recent years, several amateur radio operators have attempted to overcome this shortcoming of SSB by experimenting with audio processing and with the filters in their transmitters and transceivers. While this does increase the bandwidth of a transmitted J3E emission somewhat, it results in a noticeable improvement in the naturalness of the transmitted audio, so that the human voice actually sounds *human*, without the “tinny” quality of most SSB audio heard on the amateur frequency bands. Provided that the transmitter does not generate excessive intermodulation distortion (IMD), this increase in occupied bandwidth should not be objectionable. These experiments are described by John M. Anning<sup>3</sup> and others. The Petitioners themselves have reproduced this material as an exhibit to their Petition.<sup>4</sup> In their Petition, the

Petitioners make numerous spurious and unsubstantiated claims in their call to add regulations to Part 97 which would ban such experimentation on amateur frequencies below 28.8 MHz.

- 1. The Petitioners make unsubstantiated accusations against other amateur radio operators or groups of amateur radio operators in order to justify their Petition for Rulemaking.** In the Petition, we see, “One group appears on the amateur bands during international radio contests, tweaking and adjusting their transmitters to splatter purposely, in order to provide themselves “elbowroom” (sic) during a contest on a very crowded band.”<sup>5</sup> Nowhere do the Petitioners provide any documentation of such activity. And if such activity is indeed taking place, it would be construed as causing willful or malicious interference with the contest stations. Such interference is already prohibited in Section 97.101 (d) of the Commission’s Rules.<sup>6</sup> In addition, “splatter” is defined as spurious sidebands that are produced when a transmitter employing any type of amplitude modulation (A3E, J3E, R3E, etc.) is overmodulated. This is already prohibited by Section 97.307 (b) of the Commission’s Rules.<sup>7</sup> We clearly do not need any additional regulations to prohibit something that is already prohibited under existing regulations. The Petition appears to be nothing more than a vindictive act resulting from a “turf war” between two groups of amateur radio operators whose favorite types of operation conflict with each other.
- 2. The Petition contradicts itself regarding SSB bandwidth while making unsubstantiated claims.** The Petition states, “As the Commission well knows, numerous serious scientific studies have established that voice communication wide enough to provide “naturalness” is achievable using audio modulating frequencies of from 300 to 3,000 Hz.”<sup>8</sup> Where are these “numerous serious scientific studies” and why were they not quoted in the Petition? This appears to be nothing more than pure puffery, not unlike that used by a used car salesman in trying to move cars off his employer’s lot. No attempt is made here to account for sibilant sounds, which enhance intelligibility, nor for the overtones that occur in the human voice, particularly in the female voice. The Petition further states, “In practice, many amateur SSB transmitters contain frequencies down to about 70 or 80 Hz and create no problems for adjacent stations.”<sup>9</sup> Let’s examine this statement from a technical viewpoint. In a conventional A3E emission, the total bandwidth is determined by the highest modulating frequency, as the upper sideband consists of the sum of the audio modulating frequencies plus the carrier frequency. The lower sideband consists of the difference products. The inclusion of low audio frequency components in the modulating audio will not widen the bandwidth of an A3E transmitter, provided, of course, that the transmitter is not overmodulated. This is not the case with J3E emission. Since no significant carrier is transmitted with J3E emission, the total *audio* bandwidth is the total bandwidth of the emission. If the SSB transmitter is modulated with audio ranging from 70 Hz to 3,000 Hz, the bandwidth of the resulting J3E emission would be 3,000 – 70 Hz, or 2,930 Hz (2.93 kHz). But the Petitioners are asking the Commission to amend Part 97 to state, “No amateur station transmission using J3E shall occupy more than 2.8 kHz bandwidth on any amateur frequency below 28.8 MHz...”<sup>10</sup> If a J3E emission of 2.93 kHz bandwidth is not creating any problems for adjacent stations<sup>11</sup>, why do we need yet another regulation in Part 97 to address an apparently nonexistent problem? Clearly, the Petitioners contradict themselves here. And the Petitioners appear to demonstrate a lack of knowledge of basic radio theory pertaining

to SSB transmission. The Petitioners further state, “It is the emphasis on and transmitting of modulating frequencies *above* 3,000 Hz that are largely responsible for unnecessary bandwidth in the case of so-called “Hi-Fi Audio” SSB transmission, excoriated by (FCC Special Consul Riley) Hollingsworth and hundreds of complaining amateurs”.<sup>12</sup> (Emphasis theirs) First, who are these “hundreds of complaining amateurs”? Why are they not listed in any of the exhibits at the end of the Petition? This is obviously more puffery that is totally without substantiation. Second, the radio amateurs who advocate the transmission of enhanced fidelity SSB prescribe audio equalization which boosts the low-frequency audio components in order to eliminate the “tinny” quality of many common SSB transmitters, while boosting some of the highs to improve intelligibility.<sup>13</sup> The emphasis seems to be on boosting the lows to increase naturalness. The Petitioners further state, “The Petitioners are aware that many amateur transmitters would already meet a 2.8 kHz *de jure* standard if imposed. For those transmitters that would not meet the standard, a simple “high pass” audio circuit could be installed between a microphone of a station and the microphone input.”<sup>14</sup> Once again, the Petitioners demonstrate their lack of technical knowledge. A high pass audio circuit (filter) would pass precisely those frequencies above 3,000 kHz that the Petitioners claim are so objectionable! And a simple audio filter would do nothing to eliminate excessive bandwidth caused by overmodulation (“splatter”), nor would it correct excessive bandwidth caused by high levels of intermodulation distortion (IMD) in a malfunctioning SSB transmitter or RF power amplifier. Concerning A3E emission, the Petitioners call for an arbitrary bandwidth limit of 5.6 kHz on any amateur frequency below 28.8 MHz.<sup>15</sup> This fails to take into account the sibilance that increases the intelligibility of the transmission.

3. **The Petition fails to define the criteria for the bandwidth limits that it prescribes.** In prescribing a maximum bandwidth of 2.8 kHz for J3E emission or 5.6 kHz for A3E emission, no explicit definition of this bandwidth is given. For example, for J3E, is the bandwidth 2.8 kHz at the –26 dB points? Nowhere is this specified in the Petition. Without an emission mask similar to that prescribed in Section 73.44 (b) for the AM Broadcast Service, how would one know if his or her transmitter would be in compliance with these proposed regulations?
4. **The additional regulations prescribed in this Petition would cause an unnecessary financial burden on amateur stations that would need to determine if they are in compliance with the proposed regulations.** In the AM Broadcast Service, stations are required to take annual measurements to ensure that they are in compliance with the bandwidth limitations (the NRSC mask) prescribed in Section 73.44 (b)<sup>16</sup> of the Commission’s Rules. Section 73.44 (a) states the procedure necessary for taking these measurements.<sup>17</sup> Both the spectrum analyzer mentioned in this Section and the “other specialized equipment” (e.g., the Delta Electronics Splatter Monitor) are prohibitively expensive and would be out of the reach of most amateur radio operators. Many smaller AM broadcast stations do not have such equipment. They either hire outside broadcast engineers to make these measurements on a contract basis or they rent the required test equipment. Equipment rental is also quite expensive and would be beyond the reach of many amateur radio operators.

5. **The regulations proposed in this Petition would further stifle experimentation, thereby conflicting with the basis and purpose of the Amateur Radio Service, as prescribed elsewhere in the Commission's Rules.** Section 97.1 (b) of the Commission's Rules calls for "*Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art*". (Emphasis supplied) Section 97.1 (c) further states, "Encouragement and improvement of the amateur service *through rules which provide for advancing skills in both the communications and technical phases of the art*". (Italics supplied) The enhanced fidelity SSB transmissions are experimental in nature. Does the contest-type activity favored by the Petitioners<sup>18</sup> do anything to advance the state of the radio art?<sup>19</sup> How would the additional regulations proposed in this Petition encourage experimentation? The existing straitjacket of restrictions and regulations contained in Sections 97.307, 97.309, and 97.311 of the Commission's Rules already tends to discourage experimentation and innovation. Part of these enhanced fidelity SSB experiments requires the participating stations to make radio contact with other amateur radio stations. The proposal to limit such activity to amateur frequencies above 28.8 MHz would limit these experimenters to frequencies that are useless for anything except short-range, local communications during most of the 11 year sunspot cycle.
6. **The Petition ignores the real reason for frequency congestion in the HF amateur frequency bands.** Section 97.301 of the Commission's Rules defines the bands of frequencies available to various classes of amateur radio operators. Section 97.305 (a) states, "An amateur station may transmit a CW (type A1A) emission on any frequency authorized to the control operator." Section 97.305 (c) prescribes the subbands within the amateur radio bands in which other types of emission are authorized.<sup>20</sup> "Data", as mentioned in Section 97.305 (c), refers principally to various radioteleprinter emissions, including frequency-shift keying using the Baudot code or various narrowband, direct printing codes (e.g., AMTOR, PACTOR) and to the newer, ultra-narrowband emissions using phase-shift keying (e.g., PSK31). This division of the amateur bands below 28 MHz into emission subbands does not take into account the greater bandwidth occupied by any type of radiotelephone emission vis-à-vis the bandwidth occupied by CW (A1A) or "data" emissions. Clearly, the solution to relieving overcrowding on the more popular HF bands would be to either expand the subbands available to radiotelephone emissions or to abolish subbands entirely, allowing the amateur radio community to determine its own bandplans, as is currently done on the 160 m band (1800-2000 kHz) and as is currently done in Canada and most other countries of the world. But the Petitioners ignore this issue entirely, choosing instead to hobble a small group of experimenters who mostly use spot frequencies on various bands.<sup>21</sup>

#### **4. Conclusion**

One may readily conclude that this Petition, which has been assigned the number RM-10740 by the Commission, is totally without merit and should be summarily dismissed.

Respectfully submitted,

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#### **Endnotes:**

<sup>1</sup> Sec. 1.401 Petitions for rulemaking. (a) Any interested person may petition for the issuance, amendment or repeal of a rule or regulation. (b) The petition for rulemaking shall conform to the requirements of Sec. 1.49, 1.52 and 1.419(b) (or Sec. 1.420(e), if applicable), and shall be submitted or addressed to the Secretary, Federal Communications Commission, Washington, DC 20554, or (except in broadcast allotment proceedings) may be submitted electronically. (c) The petition shall set forth the text or substance of the proposed rule, amendment, or rule to be repealed, together with all facts, views, arguments and data deemed to support the action requested, and shall indicate how the interests of petitioner will be affected. (d) Petitions for amendment of the FM Table of Assignments (Sec. 73.202 of this chapter) or the Television Table of Assignments (Sec. 73.606) shall be served by petitioner on any Commission licensee or permittee whose channel assignment would be changed by grant of the petition. The petition shall be accompanied by a certificate of service on such licensees or permittees. A draft Notice of Proposed Rule Making may be submitted with a petition for amendment of the FM or Television Table of Assignments. (e) Petitions which are moot, premature, repetitive, frivolous, or which plainly do not warrant consideration by the Commission may be denied or dismissed without prejudice to the petitioner.

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<sup>2</sup> The Communications Act of 1934, as amended, may be viewed on the Commission's Web site at the following URL: <http://www.fcc.gov/Reports/1934new.pdf>

<sup>3</sup> Web site of John M. Anning, Amateur Radio Station NU9N, <http://www.nu9n.com>

<sup>4</sup> Exhibit II, Petition, Pages 9 and 10

<sup>5</sup> Petition, Page 2

<sup>6</sup> Section 97.101 (d): No amateur operator shall willfully or maliciously interfere with or cause interference to any radio communication or signal.

<sup>7</sup> Section 97.307 (b): Emissions resulting from modulation must be confined to the band or segment available to the control operator. Emissions outside the necessary bandwidth *must not cause splatter* or keyclick interference to operations on adjacent frequencies. (Emphasis supplied)

<sup>8</sup> Petition, Page 3, Paragraph 2.1 ("Regarding Single Sideband Transmission")

<sup>9</sup> Ibid.

<sup>10</sup> Petition, Page 4, Paragraph 3.0 ("Suggestions for *de jure* standards")

<sup>11</sup> Petition, Page 3, Paragraph 2.1 ("Regarding Single Sideband Transmission")

<sup>12</sup> Ibid.

<sup>13</sup> Web site of John M. Anning, Amateur Radio Station NU9N: [http://www.icycolors.com/nu9n/tx.html#EQ\\_Setup](http://www.icycolors.com/nu9n/tx.html#EQ_Setup)

<sup>14</sup> Petition, Page 5, Paragraph 4.0 ("Petitioner's (sic) Discussion of Practical Issues facing Amateurs in meeting *de jure* Standards") (sic)

<sup>15</sup> Petition, Page 4, Paragraph 3.0 ("Suggestions for *de jure* standards")

<sup>16</sup> Section 73.44 (b) states: "Emissions 10.2 kHz to 20 kHz removed from the carrier must be attenuated at least 25 dB below the unmodulated carrier level, emissions 20 kHz to 30 kHz removed from the carrier must be attenuated at least 35 dB below the unmodulated carrier level, emissions 30 kHz to 60 kHz removed from the carrier must be attenuated at least  $[5 + 1 \text{ dB/kHz}]$  below the unmodulated carrier level, and emissions between 60 kHz and 75

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kHz of the carrier frequency must be attenuated at least 65 dB below the unmodulated carrier level. Emissions removed by more than 75 kHz must be attenuated at least  $43 + 10 \log(\text{Power in watts})$  or 80 dB below the unmodulated carrier level, whichever is the lesser attenuation, except for transmitters having power less than 158 watts, where the attenuation must be at least 65 dB below carrier level.”

<sup>17</sup> Section 73.44 (a) states: “Emissions shall be measured using a properly operated and suitable swept-frequency RF spectrum analyzer using a peak hold duration of 10 minutes, no video filtering, and a 300 Hz resolution bandwidth, except that a wider resolution bandwidth may be employed above 11.5 kHz to detect transient emissions. Alternatively, other specialized receivers or monitors with appropriate characteristics may be used to determine compliance with the provisions of this section, provided that any disputes over measurement accuracy are resolved in favor of measurements obtained by using a calibrated spectrum analyzer adjusted as set forth above.”

<sup>18</sup> Petition, Page 2

<sup>19</sup> A “contest”, in the context of the Amateur Radio Service, is a type of competitive activity in which participants try to contact the maximum number of stations possible, usually within a 24 or 48-hour period, while running up score points. The geographical location of the contacted station, the station’s callsign prefix, and other factors are often used as score multipliers. These contests cause considerable congestion on amateur radio frequencies between 1800 kHz and 29.7 MHz, often rendering the affected bands useless for other types of communications.

<sup>20</sup> Section 97.305 (c): “ A station may transmit the following emission types on the frequencies indicated, as authorized to the control operator, subject to the standards specified in Sec. 97.307(f) of this part.”



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Standards see Sec. 97.307(f),

Wavelength band      Frequencies      Emission types authorized      paragraph:

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MF:

160 m      Entire band..... RTTY, data..... (3).

160 m      Entire band..... Phone, image..... (1), (2).

HF:

80 m      Entire band..... RTTY, data..... (3), (9).

75 m      Entire band..... Phone, image..... (1), (2).

40 m      7.000-7.100 MHz..... RTTY, data..... (3), (9).

40 m      7.075-7.100 MHz..... Phone, image..... (1), (2), (9), (11).

40 m      7.100-7.150 MHz..... RTTY, data..... (3), (9).

40 m      7.150-7.300 MHz..... Phone, image..... (1), (2).

30 m      Entire band..... RTTY, data..... (3).

20 m      14.00-14.15 MHz..... RTTY, data..... (3).

20 m      14.15-14.35 MHz..... Phone, image..... (1), (2).

17 m      18.068-18.110 MHz.... RTTY, data..... (3).

17 m      18.110-18.168 MHz.... Phone, image..... (1), (2).

15 m      21.0-21.2 MHz..... RTTY, data..... (3), (9).

15 m      21.20-21.45 MHz..... Phone, image..... (1), (2).

12 m      24.89-24.93 MHz..... RTTY, data..... (3).

12 m      24.93-24.99 MHz..... Phone, image..... (1), (2).

10 m      28.0-28.3 MHz..... RTTY, data..... (4).

10 m      28.3-28.5 MHz..... Phone, image..... (1), (2), (10).

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10 m      28.5-29.0 MHz..... Phone, image..... (1), (2).

10 m      29.0-29.7 MHz..... Phone, image..... (2).

The “80 m” band, as defined in Section 97.301 of the Commission’s Rules, is the segment from 3500 to 3750 kHz.

The “75 m band”, as defined here, is the segment from 3750 to 4000 kHz.

<sup>21</sup> The frequencies used for Type A3E emission on the HF bands may be found on the AM Window Web site, <http://www.amwindow.org>. Information pertaining to the enhanced-fidelity SSB operations may be had from John M. Anning at <http://www.nu9n.com>.